

ITERATIVE REPAIR OPTIMIZATION
WITH PARTICULAR APPLICATION TO
SCHEDULING FOR INTEGRATED CAPACITY AND INVENTORY PLANNING

Monte Zweben

Michael J. Deale

Eugene D. Davis

Brian L. Daun

ABSTRACT

A schedule for a complex activity is obtained by a
10 scheduling system using a method of constraint-based
iterative repair. A predetermined initial schedule is
iteratively repaired, repairs being made during each
iteration only to portions of the schedule that produce a
constraint violation, until an acceptable schedule is
15 obtained. Since repairs are made to the schedule only to
repair violated constraints, rather than to the entire
schedule, schedule perturbations are minimized, thereby
reducing problems with the dynamic performance of the
scheduling system and minimizing disruption to the smooth
20 operation of the activity. All constraints on the
scheduling activity can be evaluated simultaneously to
produce a solution that is near optimal with respect to all
constraints. In particular, consumable resource constraints
can be evaluated simultaneously with other constraints such
25 as, for example, reusable resource constraints, temporal
constraints, state constraints, milestone constraints and
preemptive constraints. The scheduling system of the
invention is much quicker than ^{previous scheduling} ~~previously used~~ systems that
use, for example, constructive scheduling. ^{method} ~~The system~~ ^{of the invention} can
30 also be easily modified to add, delete or modify
constraints. Because of the minimization of schedule
perturbation, ^{and} ~~ease of~~ modification, the scheduling system of
the invention is particularly useful for scheduling
35 applications that require frequent and rapid rescheduling.